170202

# FLOOD INSURANCE STUDY

## VILLAGE OF CAROL STREAM, ILLINOIS

DU PAGE COUNTY

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

VILLAGE OF CAROL STREAM,
DUPAGE COUNTY, ILLINOIS

# 1.0 INTRODUCTION

## 1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Carol Stream, DuPage County, Illinois, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the Village of Carol Stream to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

## 1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers, Chicago District, for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-16-75, Project Order No. 19 and Inter-Agency Agreement No. IAA-H-7-76, Project Order No. 1. This study was completed in April 1977, and was partially revised in January 1981.

## 1.3 Coordination

Community base map selection and the identification of streams requiring detailed study were accomplished at a meeting attended by personnel of the U.S. Army Corps of Engineers (COE), the FIA, the Illinois Division of Water Resources, and officials of the Village of Carol Stream in January 1975. The Soil Conservation Service (SCS) and the U.S. Geological Survey (USGS) were contacted in an effort to obtain previously developed hydrologic and hydraulic information. The Northeastern Illinois Department of Transportation, Division of Water Resources was contacted for information concerning 100-year flood elevations and flood plain topography.

During the course of the work by the COE, flood elevations, flood boundaries, and floodway delineations were reviewed with community officials and with officials of the State Division of Water Resources. All hydrologic analyses were submitted for review, approval, and coordination to the Illinois State Water Survey, the repository for all such information developed for streams within the State of Illinois.

On November 16, 1976, the results of the work by the Study Contractor were reviewed at a meeting attended by representatives of the COE, the FIA, and the Illinois Division of Water Resources and by officials and residents of the Village of Carol Stream.

On January 19, 1981, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, the FIA, and the community.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Carol Stream, DuPage County, Illinois. The area of study is shown on the Vicinity Map (Figure 1).

The areas initially studied by detailed methods were selected with priority given to all known flood hazard areas of projected development or proposed construction for the next five years or through April 1982. These areas have been restudied by detailed methods to reflect present development or proposed construction for the next five years through April 1986.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by the FIA and the Village of Carol Stream.

Klein Creek was studied in detail from the downstream corporate limits located just downstream of Kuhn Road to the upstream corporate limits. Thunderbird Trail Creek was studied in detail from the confluence at Klein Creek to a point about 200 feet upstream of Blackhawk Drive. Winfield Creek was studied in detail from Geneva Road to the upstream corporate limits. Klein Creek Tributary No. 3 was studied by limited detail methods within the corporate limits. Flooding on several small streams in the village and flooding caused by ponding of runoff were studied by approximate methods.

### 2.2 Community Description

The Village of Carol Stream is located in north-central DuPage County in northeastern Illinois. The Village of Glendale Heights is located directly east of Carol Stream, while the City of Wheaton is due south. The remainder of the community is bounded by the unincorporated areas of DuPage County. The village is primarily a residential community; however,

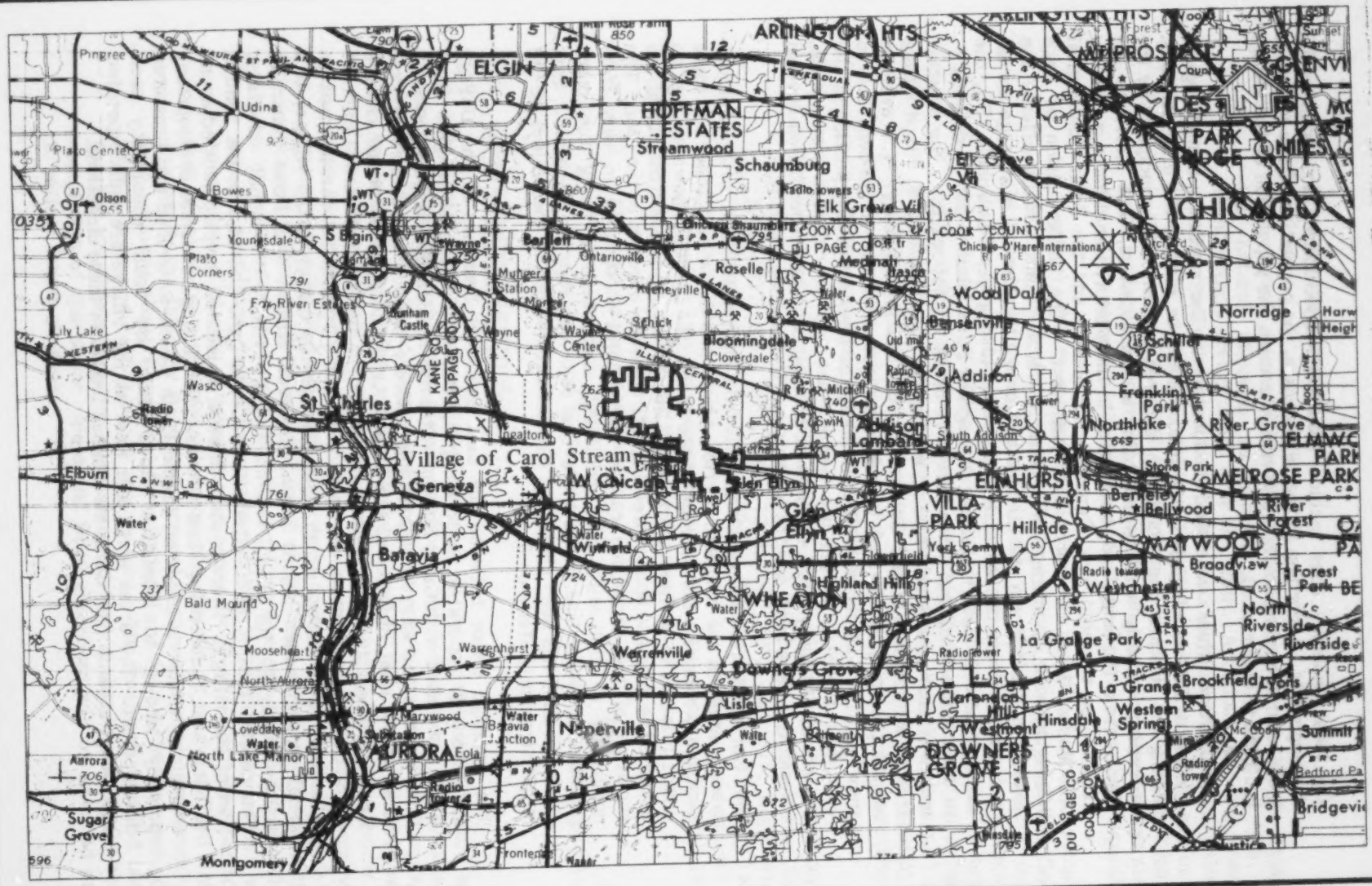


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

# VILLAGE OF CAROL STREAM, IL
(DU PAGE CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

## VICINITY MAP

the local economy does include industrial, agricultural, and commercial developments. According to the 1970 census, the population of the village is 4,434, and according to the 1979 village census, the population of the village is 13,250 (Reference 1).

The DuPage River watershed is located in the northern climatological division of Illinois which is in the mild temperate zone of the mid-latitudes. During the summer, the climate in the area is controlled principally by the prevailing westerly winds which bring in warm, moist, Gulf Maritime Air Masses from the south and southwest. In the winter, the climate is directly affected by the cold, dry, Canadian Air Masses and the Polar Continental Air Masses from the north and northwest. The buffer action of Lake Michigan, with its storage of relatively warm waters, usually affects the path of cyclonic storm and air masses through the area. The average annual temperature over the watershed is about 49 degrees Fahrenheit (F.), the average monthly extremes being 22 degrees F. in January and 73 degrees F. in July. Lake Michigan often serves to break up hot spells in the summer and, when not extensively frozen, cold spells in the winter. The first killing frost usually occurs in mid-October and the last in early May. The average annual precipitation is 34.2 inches with approximately 10 percent due to snowfall. The summer rainfall is normally the heaviest of any portion of the year, yet there is no definite period that can be called a wet season. Periods of unusually large amounts of precipitation are recorded on several consecutive days in all months of the year (References 2 and 3).

The DuPage River Basin is largely undulating prairie land with numerous marshy areas in the northern portion. Hard and dense limestone, and some sandstone, comprise the bedrock of the area. The bedrock, however, has no direct relation to surface expression. During the ice age, extensions of ice covered the area and upon retreating left morainic deposits in the area. The variation of the deposition caused the general topography to vary from undulating to flat with the undulating characteristic being the more prominent. There are, however, a few rock outcrops in the basin. Post glacial erosion has been slight and has been restricted to the valleys of the larger streams (Reference 3).

The drainage divide between the East and West Branches of the DuPage River roughly separates the drainage patterns of Glendale Heights from those associated with Carol Stream. Streams in Glendale Heights generally flow towards the East Branch DuPage River; those in Carol Stream flow towards the West Branch DuPage River. As Winfield Creek crosses Geneva Road, it leaves the undeveloped marshland in the southeastern corner of Carol Stream and enters an area of extreme residential development in Wheaton. Klein Creek, which flows through the center of the village, is a small stream which begins north of Carol Stream and flows generally southwesterly to the West Branch DuPage River. A small tributary, Thunderbird Trail Creek, enters Klein Creek from the east in the central part of the village. There is some intense residential development adjacent to Klein and Thunderbird Trail Creeks. Continuing economic development within the village is expected in the Klein Creek watershed and pressures possibly leading to intensified flood plain use could accompany such development. The areas north and west of the village are unincorporated and recent expansion by Carol Stream has tended in these directions.

## 2.3 Principal Flood Problems

The principal causes of flooding in the area are the inadequate capacities of the natural channels to contain the runoff resulting from intense thunderstorm precipitation over the basin. Additional flooding problems are created by the many channel and floodway constrictions resulting from inadequate waterway openings at bridges and the flood plain encroachments in urban areas. Many of the bridges, principally those along Klein Creek, have inadequate waterway openings which cause increased water stages and flooding upstream of the bridge when discharges exceed their capacity.

A matter of serious concern has been the growth of urban development on the flood plain of the river. This haphazard occupation of the flood plain has resulted in constriction of both the channel and available floodways. Houses, garages, fences, and related construction have been built on the immediate banks of the river without adequate consideration of their effect on flood flows on the river and are subject to early inundation in high water stages and also serve to block effective flow of the floodwaters. Today, the village uses the Ven Te Chow method (Reference 4) for computing storage requirements for developing areas, which by its nature is restrictive and alleviates the magnitude of existing flooding.

Repeated damage to structures in the flood plains has occurred during such floods as those that occurred in 1942, 1947, 1948, 1949, 1950, 1951, 1953, 1954, 1957, 1959, 1961, 1962, 1966, 1967, 1972, and 1975. High water marks available along Klein Creek indicate elevations of approximately 743 feet in October 1954 and 743 feet in June 1962. Both of these storms have an estimated 10-year recurrence interval. Views of the August 1972 flood along Klein Creek are shown in Figures 2 and 3.

## 2.4 Flood Protection Measures

There are no flood protection works existing or planned on streams within the village.

# 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten), and for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

FIGURE 2 - August 1972 Flood on Klein Creek at Carol Stream.

FIGURE 3 - August 1972 Flood on Klein Creek at Carol Stream.

## 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

Frequency-discharge data for streams studied in detail were developed through use of the "Chicago Metropolitan Study, DuPage River Basin" performed by the COE (Reference 5). In the Chicago study, the DuPage River Basin above Shorewood, Illinois was divided into sub-areas and a generalized HEC-1 rainfall-runoff computer model was calibrated for the basin (Reference 6). Using 24-hour rainfall data obtained from the U.S. Weather Bureau, one-hour values, in critical order, were entered into the HEC-1 model of the basin to determine the 10-, 50-, and 100-year peak discharges at various locations (Reference 7). The peak discharge values used in this study were obtained by application of the square root of the drainage area ratio to the values derived for the appropriate HEC-1 model sub-area discussed above. The hydrologic analysis of Klein Creek Tributary No. 3 was directly transferred from the DuPage County Flood Insurance Study (Reference 8). Discharges for the 10-year and 100-year floods of Klein Creek Tributary No. 3 were computed using the log-Pearson Type III Method (Reference 9).

Discharges for the 500-year floods of all streams were determined by linear extrapolation of a log-probability graph of flood discharges computed for frequencies up to 100 years.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (SQ MILES) | PEAK DISCHARGE (CFS) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|---|
| KLEIN CREEK | | | | | |
| Downstream of Thunderbird Trail | 6.37 | 445 | 592 | 655 | 947 |
| 1,000 feet upstream of Dam "A" | 4.90 | 400 | 542 | 619 | 817 |
| THUNDERBIRD TRAIL CREEK | | | | | |
| Confluence with Klein Creek | 1.22 | 220 | 300 | 355 | 515 |
| WINFIELD CREEK | | | | | |
| Downstream corporate limits | 2.91 | 330 | 455 | 530 | 760 |
| KLEIN CREEK TRIBUTARY NO. 3 | | | | | |
| At mouth | 0.78 | 140 | N/A | 208 | N/A |

## 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

Cross section data for streams in the area were obtained by field measurement. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Roughness coefficients (Manning's "n") for the hydraulic computations were assigned on the basis of field inspection of flood plain areas. Roughness values varied for each stream studied in detail as shown in the following table.

| FLOODING SOURCE | CHANNEL | OVERBANK |
|---|---|---|
| Klein Creek | 0.03 - 0.045 | 0.06 - 0.08 |
| Thunderbird Trail Creek | 0.035 | 0.065 |
| Winfield Creek | 0.06 | 0.08 |
| Klein Creek Tributary No. 3 | 0.055 | 0.07 |

Starting water-surface elevations for all streams studied by detailed and limited detail methods were calculated using the slope-area method. Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 10). Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. The hydraulic analysis of Klein Creek Tributary No. 3 was transferred from the Du Page County Flood Insurance Study (Reference 8).

In determining the areas flooded by streams and areas of ponding studied by approximate methods, topographic maps which depict the extent of recent historical floods were used as a guide (Reference 11).

The 100-year flood stage for streams studied by approximate methods was determined by solving Manning's equation for depth of flow in the channel (Reference 12). These streams were field inspected to obtain typical stream cross sections, average stream bed slope, and Manning's "n" values.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

## 4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

### 4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using topographic maps at a scale of 1:4800, with a contour interval of two feet (References 13 and 14).

Flood boundaries for areas of approximate study were also delineated on these 1:4800 scale topographic maps (References 13 and 14).

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

### 4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights

to 1.0 foot, provided that hazardous velocities are not produced. In Illinois, though, under Section 65f, Chapter 19, Illinois Revised Statutes (Reference 15) encroachment in the flood plain is limited to that which will cause only an insignificant increase in flood heights. Thus, at the recommendation of the Division of Water Resources, a floodway having no more than a 0.1-foot surcharge has been delineated for this study.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown. Klein Creek Tributary No. 3 was studied by limited detailed method, and therefore, no floodway was computed on this stream.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 4.

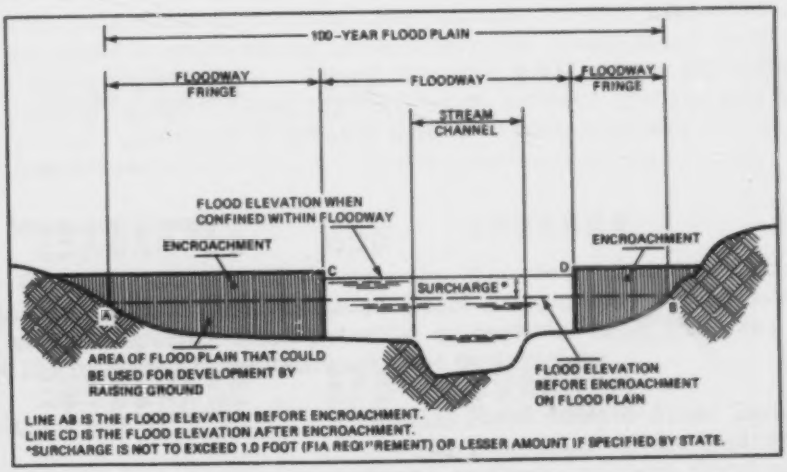
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FIGURE 4 - Floodway Schematic

## 5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source affecting the Village of Carol Stream.

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQ. FEET) | MEAN VELOCITY (FEET/SEC.) | REGULATORY (NGVD) | WITHOUT FLOODWAY (NGVD) | WITH FLOODWAY (NGVD) | INCREASE (FEET) |
| THUNDERBIRD TRAIL CREEK | | | | | | | | |
| A | 0.021 | 32 | 66 | 5.4 | 747.3 | 744.8[2] | 744.9 | 0.1 |
| B | 0.042 | 36 | 81 | 4.4 | 747.3 | 745.4[2] | 745.4 | 0.0 |
| C | 0.222 | 36 | 95 | 3.7 | 748.3 | 748.3 | 748.3 | 0.0 |
| D | 0.259 | 94 | 144 | 2.5 | 748.8 | 748.8 | 748.8 | 0.0 |
| E | 0.334 | 33 | 75 | 4.7 | 749.6 | 749.6 | 749.7 | 0.1 |
| F | 0.405 | 35 | 73 | 4.8 | 751.6 | 751.6 | 751.6 | 0.0 |
| G | 0.431 | 46 | 133 | 2.7 | 753.1 | 753.1 | 753.1 | 0.0 |
| WINFIELD CREEK | | | | | | | | |
| A | 5.845 | 455 | 1029 | 0.5 | 747.0 | 747.0 | 747.0 | 0.0 |
| B | 6.125 | 175 | 557 | 1.0 | 747.0 | 747.0 | 747.1 | 0.1 |
| C | 6.244 | 330 | 2249 | 0.3 | 747.1 | 747.1 | 747.1 | 0.0 |
| KLEIN CREEK | | | | | | | | |
| A | 2.528 | 250 | 338 | 2.7 | 746.0 | 746.0 | 746.0 | 0.0 |
| B | 2.839 | 104 | 254 | 2.6 | 747.2 | 747.2 | 747.2 | 0.0 |
| C | 3.266 | 78 | 262 | 2.4 | 748.4 | 748.4 | 748.4 | 0.0 |
| D | 3.361 | 575 | 2482 | 0.2 | 748.6 | 748.6 | 748.6 | 0.0 |
| E | 3.697 | 294 | 5222 | 0.1 | 751.8 | 751.8 | 751.8 | 0.0 |
| F | 3.949 | 525 | 7852 | 0.1 | 751.8 | 751.8 | 751.8 | 0.0 |
| G | 4.176 | 294 | 4174 | 0.1 | 752.9 | 752.9 | 753.0 | 0.1 |
| H | 4.452 | 242 | 3274 | 0.2 | 754.8 | 754.8 | 754.9 | 0.1 |
| I | 4.771 | 679 | 1443 | 0.4 | 755.6 | 755.6 | 755.7 | 0.1 |

[1]MILES ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM KLEIN CREEK

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

# VILLAGE OF CAROL STREAM, IL
(DU PAGE CO.)

## FLOODWAY DATA

## THUNDERBIRD TRAIL CREEK - WINFIELD CREEK - KLEIN CREEK

## 5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

| Average Difference Between 10- and 100-year Floods | Variation |
|---|---|
| Less than 2 feet | 0.5 foot |
| 2 to 7 feet | 1.0 foot |
| 7.1 to 12 feet | 2.0 feet |
| More than 12 feet | 3.0 feet |

The locations of the reaches determined for the Village of Carol Stream are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

## 5.2 Flood Hazard Factors

The FHF is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

## 5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Village of Carol Stream was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.

| | |
|---|---|
| Zones A1-A4: | Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF. |
| Zone B: | Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided. |
| Zone C: | Areas of minimal flooding. |

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

### 5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Carol Stream is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

## 6.0 OTHER STUDIES

The Chicago District COE has previously published a Flood Plain Information report (FPI) that included Klein Creek (Reference 16). Since that time, several culverts on Klein Creek have been replaced within Carol Stream. The flood profiles presented here reflect these changes and vary slightly from those published in the FPI report.

The Illinois Division of Water Resources also has underway a Strategic Planning Study of the Winfield Creek Basin (Reference 17). Phase I of this study consisted of problem identification and involved acquisition of orthophoto maps of the area, field surveys of the stream channel and appurtenant structures, and the initiation of hydrologic and hydraulic studies. The 100-year flood elevation was derived and additional surveys were made to ascertain the first-floor elevations of all structures in the flood plain and an accurate estimate of value of each structure is made. From this information, a determination of average annual flood damages were derived. Phase II of the Strategic Planning Study required the development

| FLOODING SOURCE | PANEL[1] | ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND | | | FLOOD HAZARD FACTOR | ZONE | BASE FLOOD ELEVATION[3] (NGVD) |
|---|---|---|---|---|---|---|---|
| | | 10% (10-YEAR) | 2% (50-YEAR) | 0.2% (500-YEAR) | | | |
| THUNDERBIRD TRAIL CREEK | | | | | | | |
| REACH 1 | 0005 | –0.7 | –0.3 | 0.6 | 005 | A1 | VARIES–SEE MAP |
| WINFIELD CREEK | | | | | | | |
| REACH 1 | 0005 | –1.2 | –0.2 | 0.4 | 010 | A2 | VARIES–SEE MAP |
| KLEIN CREEK | | | | | | | |
| REACH 1 | 0005 | –1.8 | –0.4 | 0.5 | 020 | A4 | VARIES–SEE MAP |
| REACH 2 | 0005 | –1.6 | –0.5 | 0.8 | 015 | A3 | VARIES–SEE MAP |
| REACH 3 | 0005 | –1.1 | –0.3 | 0.4 | 010 | A2 | VARIES–SEE MAP |
| REACH 4 | 0005 | –1.8 | –0.4 | 0.6 | 020 | A4 | VARIES–SEE MAP |
| REACH 5 | 0005 | –1.3 | –0.6 | 0.8 | 015 | A3 | VARIES–SEE MAP |
| REACH 6 | 0005 | –0.6 | –0.3 | 0.6 | 005 | A1 | VARIES–SEE MAP |
| KLEIN CREEK TRIBUTARY NO. 3 | | | | | | | |
| REACH 1 | 0005 | –0.4 | N/A | N/A | 005 | A1 | VARIES–SEE MAP |

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

# VILLAGE OF CAROL STREAM, IL
(DU PAGE CO.)

## FLOOD INSURANCE ZONE DATA

THUNDERBIRD TRAIL CREEK - WINFIELD CREEK - KLEIN CREEK - KLEIN CREEK TRIBUTARY NO. 3

and analyses of alternate plans of mitigating the flood damages so as to develop the most cost-effective plan of improvement wherein the highest benefit for the least cost would be derived. A full report of the studies was prepared and published for public distribution and presented all plans studied and a recommendation as to the final plan recommended for further refinement. The 100-year profile developed for this study was based on the same cross sectional data as this Flood Insurance Study. The two profiles developed have been fully coordinated and the same orthophoto maps (References 13 and 14) have been used to determine flooded areas.

All hydrologic and hydraulic data for this study were coordinated with the corresponding data developed for the Flood Insurance Studies for Wheaton and DuPage County (References 18 and 8). These studies are currently being prepared by the Chicago District COE.

A Flood Hazard Boundary Map has been published by the Federal Insurance Administration (Reference 19). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

## 7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, One North Dearborn Street, Chicago, Illinois 60602.

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KLEIN CREEK BACKWATER
ZONE A3

REACH 1
ZONE A1

MOUTH AT KLEIN CREEK

SEMINOLE LANE

THUNDERBIRD TRAIL

BLACKHAWK DRIVE

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NGVD)

754
752
750
748
746
744
742
740

0 0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45

STREAM DISTANCE IN MILES ABOVE MOUTH

A B C D E F G

LEGEND

500–YEAR FLOOD
100–YEAR FLOOD
50–YEAR FLOOD
10–YEAR FLOOD
STREAM BED
CROSS SECTION LOCATION

# FLOOD PROFILES

## THUNDERBIRD TRAIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

## VILLAGE OF CAROL STREAM, IL
(DU PAGE CO.)

01P

REACH 1
ZONE A2

748
746
744
742
740
738
736
734

ELEVATION IN FEET (NGVD)

CORPORATE LIMITS
GENEVA ROAD

CORPORATE LIMITS

A
B
C

5.80
5.90
6.00
6.10
6.20
6.30
6.40
6.50

STREAM DISTANCE IN MILES ABOVE MOUTH

LEGEND

- 500–YEAR FLOOD
- 100–YEAR FLOOD
- 50–YEAR FLOOD
- 10–YEAR FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

# FLOOD PROFILES

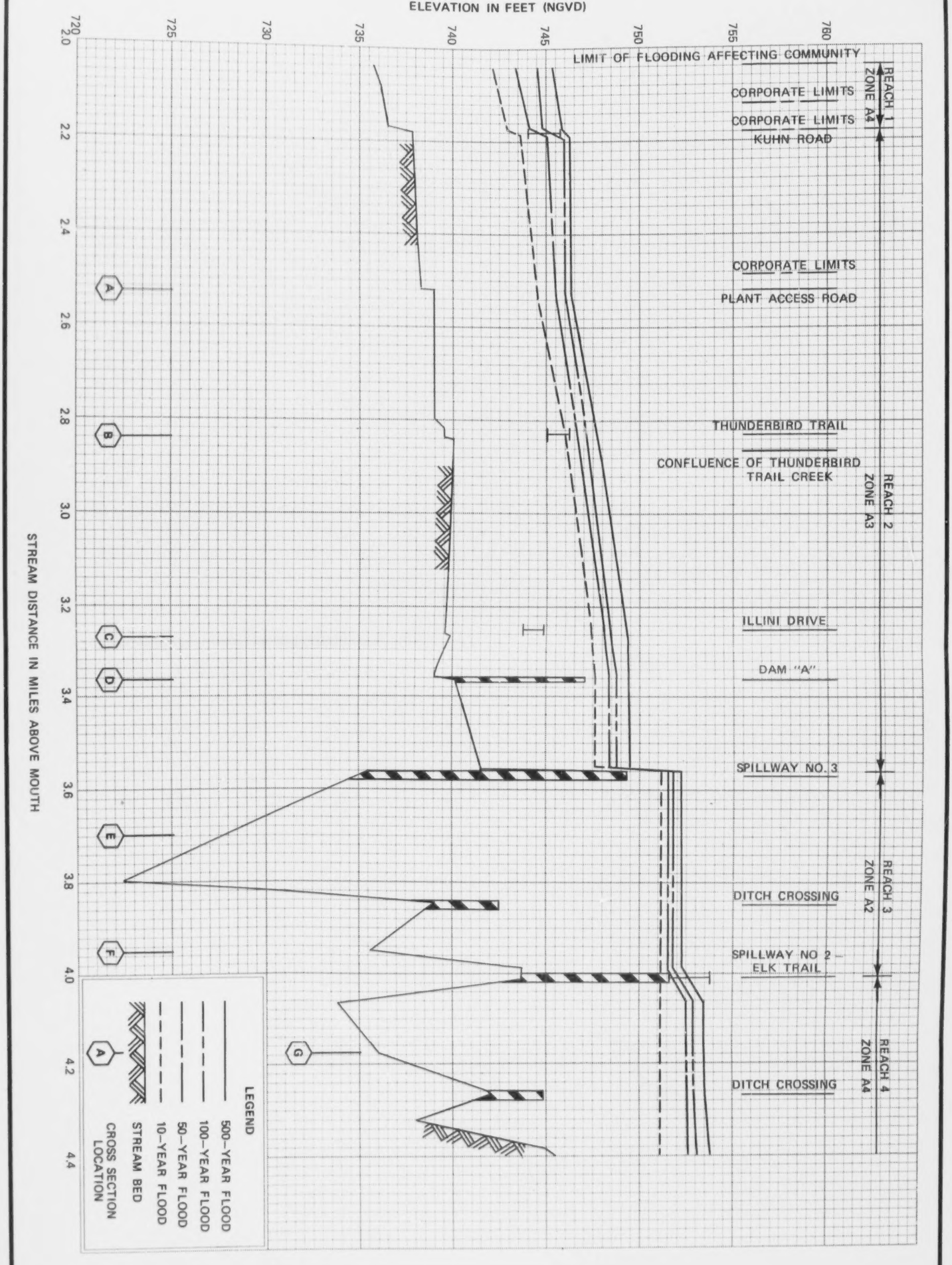
## WINFIELD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

## VILLAGE OF CAROL STREAM, IL

(DU PAGE CO.)

02P




FEDERAL EMERGENCY MANAGEMENT AGENCY
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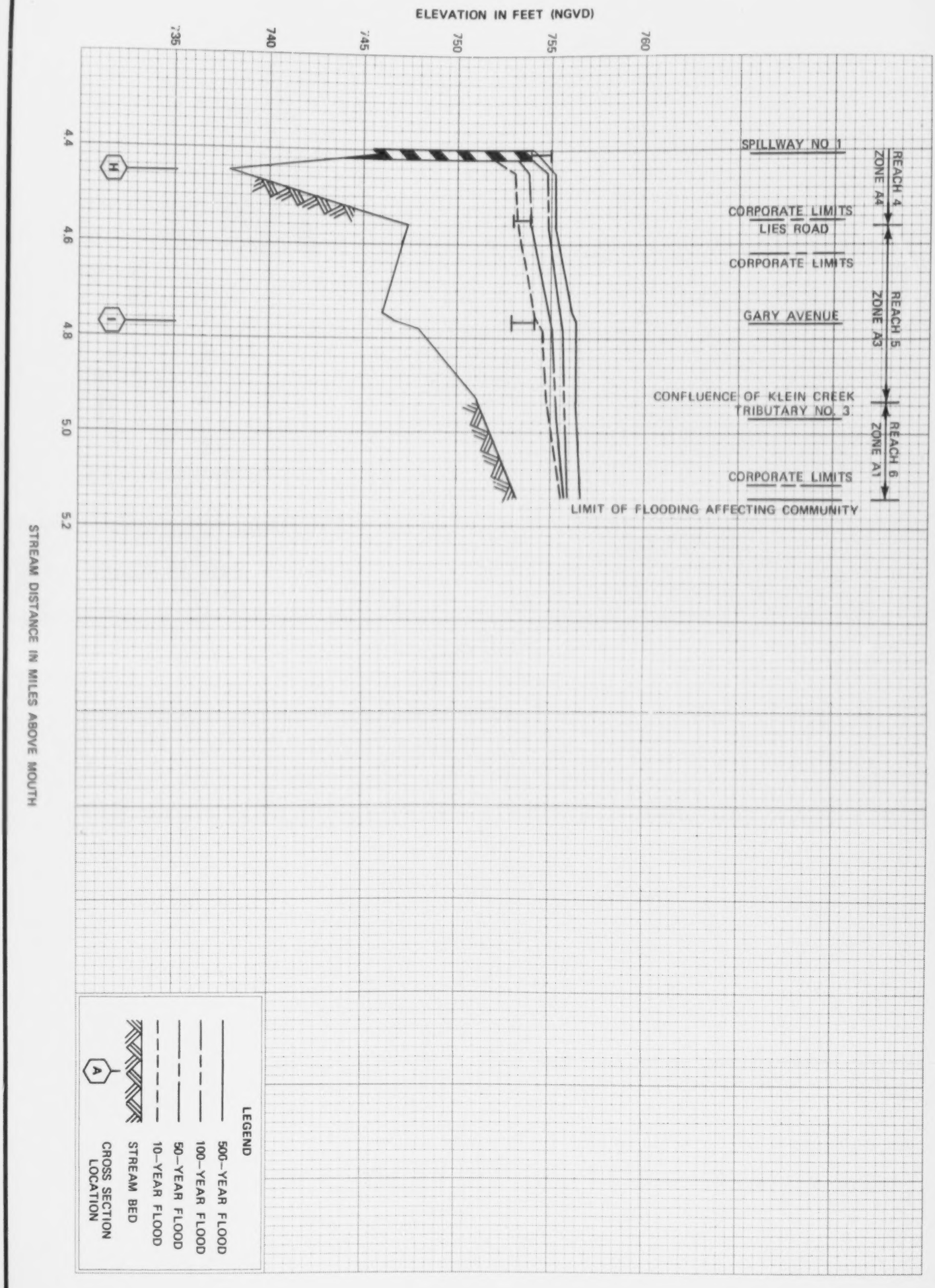
**VILLAGE OF CAROL STREAM, IL**
(DU PAGE CO.)

03P

**FLOOD PROFILES**

**KLEIN CREEK**

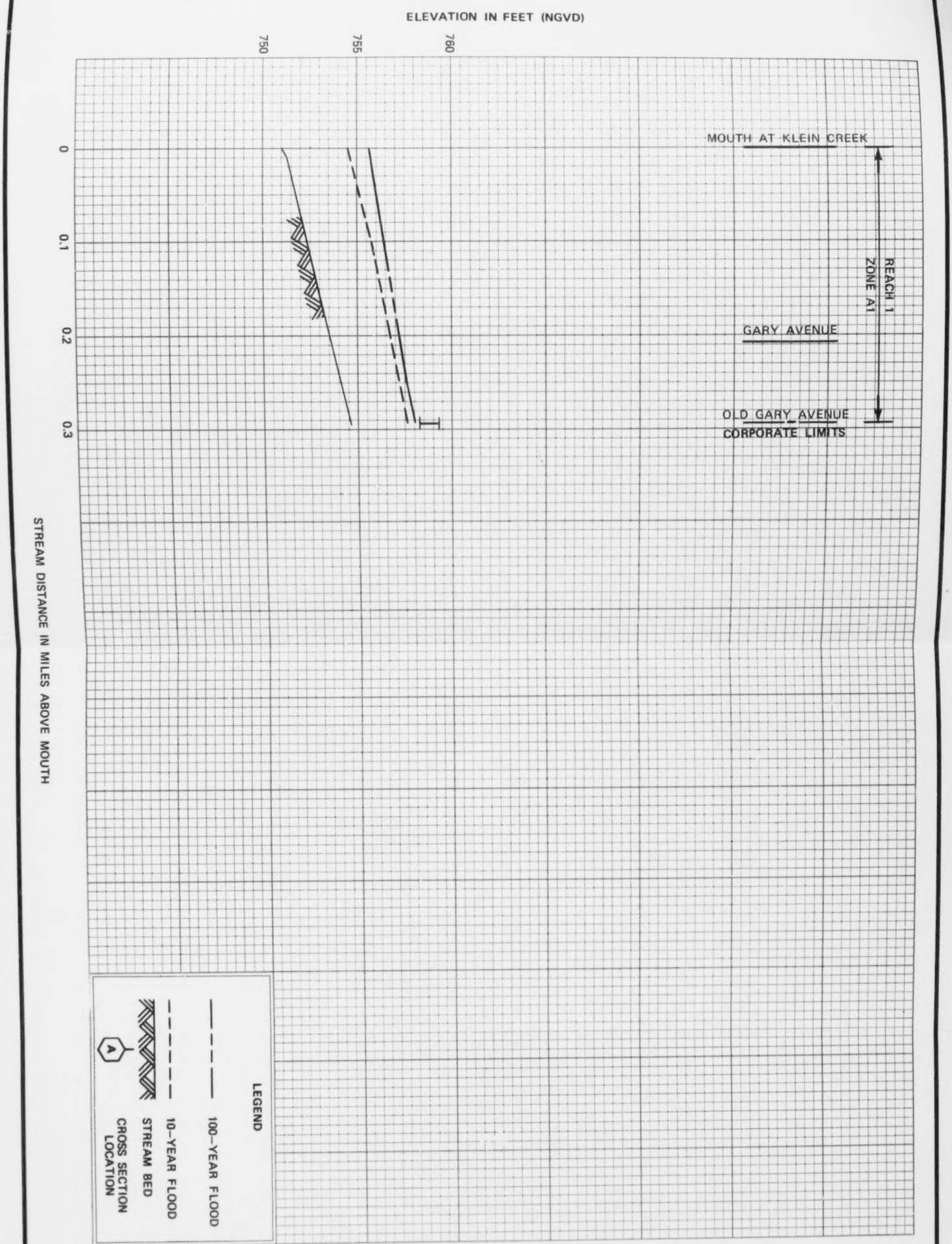



04P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration
VILLAGE OF CAROL STREAM, IL
(DU PAGE CO.)

FLOOD PROFILES

KLEIN CREEK

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|---|---|---|
| 05P | FEDERAL EMERGENCY MANAGEMENT AGENCY<br>Federal Insurance Administration<br>**VILLAGE OF CAROL STREAM, IL**<br>(DU PAGE CO.) | **FLOOD PROFILES**<br>**KLEIN CREEK TRIBUTARY NO. 3** |